



Illinois Department of Transportation

To: John Fortman Attn: District One
From: John D. Baranzelli
Subject: Pavement Design
Date: July 12, 2012

A handwritten signature in black ink, appearing to be 'J. Baranzelli', located to the right of the subject line.

FAU Route 1321 (IL 19 – Irving Park Road)
Section 32 WRS-5
Du Page County
At York Road

We have reviewed the pavement design for the above captioned section submitted to BDE on May 24, 2012. The intersection is considered "high stress" because MU ADT > 200 vehicles. The life cycle cost analysis favored the rigid design by over 10%. The approved pavement design is as follows:

IL 19 – Irving Park Road [New Construction]

10.25 inches of jointed PCC pavement with tied PCC curb & gutter
12 inches of Aggregate Subgrade Improvement
Geotechnical Fabric

IL 19 – Irving Park Road [Widening]

13 inches of Composite Pavement with tied PCC curb & gutter
1.75 inches of Polymerized HMA Surface Course Mix "F", N90
2.25 inches of Polymerized HMA Binder Course IL 19.0, N90
9 inches of PCC Base Course
12 inches of Aggregate Subgrade Improvement
Geotechnical Fabric

IL 19 – Irving Park Road [Existing Pavement Resurfacing]

Cold Milling of Existing HMA Pavement, 4 inches minimum
4 inches HMA Resurfacing

1.75 inches of Polymerized HMA Surface Course Mix "F", N90
2.25 inches of Polymerized HMA Binder Course IL 19.0, N90

York Road [New Construction]

10.25 inches of jointed PCC pavement with tied PCC curb & gutter
12 inches of Aggregate Subgrade Improvement

York Road [Widening – South of Reconstruction]

13.25 inches of Composite Pavement with tied PCC curb & gutter
1.75 inches of Polymerized HMA Surface Course Mix "F", N90
2.25 inches of Polymerized HMA Binder Course IL 19.0, N90
9.25 inches of PCC Base Course
12 inches of Aggregate Subgrade Improvement

York Road [Widening – North of Reconstruction]

12.25 inches of Composite Pavement with tied PCC curb & gutter
1.75 inches of Polymerized HMA Surface Course Mix "F", N90
2.25 inches of Polymerized HMA Binder Course IL 19.0, N90
8.25 inches of PCC Base Course
12 inches of Aggregate Subgrade Improvement

York Road [Existing Pavement Resurfacing]

Cold Milling of Existing HMA Pavement, 4 inches minimum
4 inches HMA Resurfacing
1.75 inches of Polymerized HMA Surface Course Mix "F", N90
2.25 inches of Polymerized HMA Binder Course IL 19.0, N90

If you have any questions, please contact Paul Niedernhofer at (217) 524-1651.



Illinois Department of Transportation

Memorandum

To: Catherine Kibble Attn: Serin Keller
From: Jose Dominguez By: Melchor Mangoba/Jenpai Chang
Subject: Pavement Analysis*
Date: July 13, 2012

*Route: FAU 1321 (IL 19 (Irving Park Road))
Limits: at York Road
Contract No.: 60B42
Letting: 08CY12

Section: 32 WRS-5
County: DuPage
Job No.: D-91-332-06

We have received our approved pavement design for the above captioned location in a July 12th, 2012 memo from our Central Office. Please note that the total pavement area for reconstruction exceeds 4,750 Square Yards. The improvement involves the following scope of work:

- a.) Pavement reconstruction of approximately 4,700 square yards, pavement widening and of approximately 944 square yards and resurfacing of IL 19 (Irving Park Road) at York Road from the Bensenville Ditch to just passed Garden Avenue.
- b.) Pavement reconstruction of approximately 6,400 square yards, widening of approximately 1,700 square yards and resurfacing of York Road from just west of Roosevelt Avenue to just west of Gateway Road.

A 20 year pavement analysis was performed for the pavement reconstruction and widening of IL 19 (Irving Park Road). We recommend a mechanistic-rigid pavement design for the pavement reconstruction and full depth HMA pavement for the pavement widening. The intersection of IL 19 and York Road is considered "high stress" as the design lane MU ADT exceeds 200 vehicles at the stop controlled intersection. District 1 recommends rigid pavement at "High Stress" intersections to be built at a minimum 150 ft back from the location of the stop bar. The recommended pavement is:

a.) IL 19 (Irving Park Road)

Pavement Reconstruction
Tied PCC Curb and Gutter
10 1/4" PCC Pavement (Jointed) ¹
12" Aggregate Subgrade Improvement
Geotechnical Fabric

The life cycle cost analysis favors PCC pavement by 11%.

Catherine Kibble/Serin Keller
July 13, 2012
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A segmental pavement analysis was performed for the pavement widening on IL 19 (Irving Park Road). We recommend using a composite pavement design matching into the existing pavement.

Pavement Widening

Tied PCC Curb and Gutter

13" Composite Pavement

1 ¾" Polymerized HMA Surface Course, Mix "F", N90 ²

2 ¼" Polymerized HMA Binder Course, IL-19.0, N90 ³

9" PCC Base Course ⁴

12" Aggregate Subgrade Improvement

Geotechnical Fabric

Existing Pavement Resurfacing

Cold Milling of Existing HMA Pavement

4" Minimum more, if necessary

4" HMA Resurfacing

1 ¾" Polymerized HMA Surface Course, Mix "F", N90 ²

2 ¼" Polymerized HMA Binder Course, IL-19.0, N90 ³

A 20 year pavement analysis was performed for the pavement reconstruction and widening of York Road. We, recommend a mechanistic-rigid pavement design for the pavement reconstruction and full depth HMA pavement for the pavement widening. The intersection of IL 19 and York Road is considered "high stress" as the design lane MU ADT exceeds 200 vehicles at the stop controlled intersection. The recommended pavement is:

b.) York Road*

Pavement Reconstruction

Tied PCC Curb and Gutter

10 ¼" PCC Pavement (Jointed) ¹

12" Aggregate Subgrade Improvement

The life cycle cost analysis favors PCC pavement by 11.2%.

A segmental pavement analysis was performed for the pavement widening on York Road. We recommend using a composite pavement design matching into the existing pavement south of the reconstruction and an HMA (full depth) matching the existing pavement north of the reconstruction. A 4 inch resurfacing will be used for both sections.

Pavement Widening (south of reconstruction)

Tied PCC Curb and Gutter

13 ¼" Composite Pavement

1 ¾" Polymerized HMA Surface Course, Mix "F", N90 ²

2 ¼" Polymerized HMA Binder Course, IL-19.0, N90 ³

9 ¼" PCC Base Course ⁵

12" Aggregate Subgrade Improvement

Catherine Kibble/Serin Keller
July 13, 2012
Page 3

Pavement Widening (north of reconstruction)
PCC Curb and Gutter

- 17" HMA (Full Depth) Pavement
 - 1 ¾" Polymerized HMA Surface Course, Mix "F", N90²
 - 2 ¼" Polymerized HMA Binder Course, IL-19.0, N90³
 - 13" HMA Binder Course, IL-19.0, N90⁶
- 12" Aggregate Subgrade Improvement

Existing Pavement Resurfacing

- Cold Milling of Existing HMA Pavement
 - 4" Minimum more, if necessary
- 4" HMA Resurfacing
 - 1 ¾" Polymerized HMA Surface Course, Mix "F", N90²
 - 2 ¼" Polymerized HMA Binder Course, IL-19.0, N90³

¹ Designer Note 1: To be paid as pay item #42000506 - "PORTLAND CEMENT CONCRETE PAVEMENT 10 ¼" (JOINTED)", paid in square yards.

² Designer Note 2: To be paid as pay item #40603595 - "POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, MIX "F", N90", paid in tons.

³ Designer Note 3: To be paid as pay item #40603240 - "POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, IL-19.0 N90", paid in tons.

⁴ Designer Note 4: To be paid as pay item #35300400 - "PORTLAND CEMENT CONCRETE BASE COURSE, 9", paid in square yards.

⁵ Designer Note 5: To be paid as pay item #35300405 - "PORTLAND CEMENT CONCRETE BASE COURSE, 9 ¼", paid in square yards.

⁶ Designer Note 6: To be paid as pay item #35501336 - "HOT-MIX ASPHALT BASE COURSE, 13" ", paid for in square yards.

* York Road is subject to local jurisdiction concurrence. The work south of IL 19 (Irving Park Road) is subject to Village of Bensenville. The pavement design north of IL 19 (Irving Park Road) is per the request of DuPage County. York Road is a "High Stress" intersection since the design lane MU ADT exceeds 200 vehicles. District 1 recommends rigid pavement. However, if the municipality elects to use HMA, we recommend using Mix "F" N90 at "High Stress" intersections. Either selection is preferred to be built at a minimum 150 ft back from the location of the stop bar.

If you have any questions or need additional information, please contact Jenpai Chang, Acting Pavement Design Engineer, at (847)705-4432.

By: *Jose A. Dominguez*
Jose A. Dominguez, P.E.
Project Support Engineer



Illinois Department of Transportation

Memorandum

To: John D. Baranzelli, PE

Attn: Paul R. Niedernhofer

From: Diane O'Keefe

By: Jose Dominguez

Subject: Pavement Analysis*

Date: March 21, 2012

*Route: FAU 1321 (IL 19 (Irving Park Road))

Section: 32 WRS-5

Limits: at York Road

County: DuPage

Contract No.: 60B42

Job No.: D-91-332-06

Letting: 08CY12

We are submitting the pavement analysis for the above captioned location for your review and approval. Please note that the total pavement area for reconstruction exceeds 4,750 Square Yards. The improvement involves the following scope of work:

- a.) Pavement reconstruction of approximately 4,700 square yards, pavement widening and of approximately 944 square yards and resurfacing of IL 19 (Irving Park Road) at York Road from the Bensenville Ditch to just passed Garden Avenue.
- b.) Pavement reconstruction of approximately 6,400 square yards, widening of approximately 1,700 square yards and resurfacing of York Road from just west of Roosevelt Avenue to just west of Gateway Road.

A 20 year pavement analysis was performed for the pavement reconstruction and widening of IL 19 (Irving Park Road). We recommend a mechanistic-rigid pavement design for the pavement reconstruction and full depth HMA pavement for the pavement widening. The intersection of IL 19 and York Road is considered "high stress" as the design lane MU ADT exceeds 200 vehicles at the stop controlled intersection. The recommended pavement is:

a.) IL 19 (Irving Park Road)

Pavement Reconstruction

Tied PCC Curb and Gutter

10 1/4" PCC Pavement (Jointed)

12" Aggregate Subgrade Improvement

Geotechnical Fabric

The life cycle cost analysis favors PCC pavement by 11%.

John D. Baranzelli, PE
March 21, 2012
Page 2

A segmental pavement analysis was performed for the pavement widening on IL 19 (Irving Park Road). We recommend using a composite pavement design matching into the existing pavement.

Pavement Widening

Tied PCC Curb and Gutter

13" Composite Pavement

1 ¾" Polymerized HMA Surface Course, Mix "F", N90

2 ¼" Polymerized HMA Binder Course, IL-19.0, N90

9" PCC Base Course

12" Aggregate Subgrade Improvement

Geotechnical Fabric

Existing Pavement Resurfacing

Cold Milling of Existing HMA Pavement

4" Minimum more, if necessary

4" HMA Resurfacing

1 ¾" Polymerized HMA Surface Course, Mix "F", N90

2 ¼" Polymerized HMA Binder Course, IL-19.0, N90

A 20 year pavement analysis was performed for the pavement reconstruction and widening of York Road. We, recommend a mechanistic-rigid pavement design for the pavement reconstruction and full depth HMA pavement for the pavement widening. The intersection of IL 19 and York Road is considered "high stress" as the design lane MU ADT exceeds 200 vehicles at the stop controlled intersection. The recommended pavement is:

b.) York Road*

Pavement Reconstruction

Tied PCC Curb and Gutter

10 ¼" PCC Pavement (Jointed)

12" Aggregate Subgrade Improvement

The life cycle cost analysis favors PCC pavement by 11.2%.

A segmental pavement analysis was performed for the pavement widening on York Road. We recommend using a composite pavement design matching into the existing pavement south of the reconstruction and an HMA (full depth) matching the existing pavement north of the reconstruction. A 4 inch resurfacing will be used for both sections.

Pavement Widening (south of reconstruction)

Tied PCC Curb and Gutter

13 ¼" Composite Pavement

1 ¾" Polymerized HMA Surface Course, Mix "F", N90

2 ¼" Polymerized HMA Binder Course, IL-19.0, N90

9 ¼" PCC Base Course

12" Aggregate Subgrade Improvement

John D. Baranzelli, PE
March 21, 2012
Page 3

Pavement Widening (north of reconstruction)

PCC Curb and Gutter

12 1/4" HMA (Full Depth) Pavement

1 3/4" Polymerized HMA Surface Course, Mix "F", N90

2 1/4" Polymerized HMA Binder Course, IL-19.0, N90

8 1/4" PCC Base Course

12" Aggregate Subgrade Improvement

Existing Pavement Resurfacing

Cold Milling of Existing HMA Pavement

4" Minimum more, if necessary

4" HMA Resurfacing

1 3/4" Polymerized HMA Surface Course, Mix "F", N90

2 1/4" Polymerized HMA Binder Course, IL-19.0, N90

*Designer Note 1: York Road is subject to local jurisdiction concurrence. The work south of IL 19 (Irving Park Road) is subject to Village of Bensenville. The work north of IL 19 (Irving Park Road) is subject to DuPage County.

If you have any questions or need additional information, please contact Mr. Tom Matousek at (847)705-4255.

By:
Jose A. Dominguez, P.E.
Project Support Engineer



Illinois Department of Transportation

To: Diane M. O'Keefe Attn: District One
From: Scott E. Stitt *Scott Stitt*
Subject: Pavement Design
Date: January 7, 2011

RECEIVED
JAN 21 2011

DIST. ONE - DESIGN

FAP Route 345 (Irving Park Road)
Cook/Du Page Counties
From east of York Road to east of Taft Road

We have reviewed the pavement selection for the above captioned section, which was submitted January 7, 2010. Due to the high number of MU's and construction being provided by the City of Chicago, a rigid pavement design will be utilized.

The approved pavement design for is as follows:

IL 19 (Irving Park Road)

10.25 inches of jointed PCC pavement with tied PCC curb & gutter
12 inches aggregate subgrade

Taft Road (North)

10.25 Inches of jointed PCC pavement with tied PCC curb & gutter
12 inches aggregate subgrade

Taft Road (South)

10.25 inches of jointed PCC pavement with tied PCC curb & gutter
12 inches aggregate subgrade

If you have any questions, please contact Paul Niedernhofer at (217) 524-

DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS		Init	Info	Act
District One				
Dist. Engr.				
Asst. to the D.E.				
Engr. Proj. Imp.				
Construction				
Local Roads				
Materials				
EEO				
Engr. Prog. Dev.				
Design				
Land Acq				
Programming				
Public Info				
Engr. Oper.				
Elect. Oper.				
Maintenance				
Traffic				
Administration				
To:				
To:				
Asst. Dpty. Sec.				
Qty. Compliance				
Region 1 Claims				

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: IL-19 Comments:
 Section: 321/RS-5
 County: DeWitt
 Location: at 100th Road
 Design Date:
 Modified Date:
 Facility Type: Other Marked State Road
 # of Lanes = 2
 Road Class: I
 Subgrade Support Rating (SSR): 2000
 Construction Year: 2012
 Design Period (DP) = 20 years
 Structural Design Traffic
 Minimum ADT: 0
 Actual ADT: 30,798
 Actual % of Total ADT: 87.0%
 % of ADT in Design Lane: P = 32%
 SU = 250
 MU = 750
 Struct. Design ADT = 35,400 (2022)
 PV = 0
 SU = 250
 MU = 750
 Struct. Design ADT = 35,400 (2022)
 TF flexible (Actual) = 11.09 (Actual ADT)
 TF flexible (Min) = 3.56 (Min ADT Fig. 54-2.C)
 TF rigid (Actual) = 14.79 (Actual ADT)
 TF rigid (Min) = 5.02 (Min ADT Fig. 54-2.C)

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT

Cpv = 0.15
 Csu = 132.5
 Cmu = 482.53
 TF flexible (Actual) = 11.09 (Actual ADT)
 TF flexible (Min) = 3.56 (Min ADT Fig. 54-2.C)

RIGID PAVEMENT

Cpv = 0.15
 Csu = 143.81
 Cmu = 696.42
 TF rigid (Actual) = 14.79 (Actual ADT)
 TF rigid (Min) = 5.02 (Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible = 11.09
 PG Grade Lower Binder Lifts = 2 (Fig. 53-4.R)
 HMA Mixture Temp. = 240 deg. F (Fig. 54-5.C)
 Design HMA Mixture Modulus (E_{HMA}) = 720 ksi (Fig. 54-5.D)
 Design HMA Strain (ϵ_{HMA}) = 60 (Fig. 54-5.E)
 Full Depth HMA Design Thickness = 12.25 in. (Fig. 54-5.F)
 Limiting Strain Criterion Thickness = 12.25 in. (Fig. 54-5.I)
 Use Full-Depth HMA Thickness = 12.25 inches

JPC Pavement

Use TF rigid = 14.79
 Edge Support = 100% Shoulder or C.&G.
 Rigid Pavt Thick. = 10.25 in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid = 14.79
 IBR value = 9.50
 CRCP Thickness = 9.50 in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC

Use TF flexible = 11.09
 District = 3056
 HMA Overlay Design Thickness = 10.50 in. (Fig. 54-5.U)

Unbonded Concrete Overlay

Review 54-4.03 for limitations and special considerations.

URCP Thickness = NA inches

CONTACT BMPR FOR ASSISTANCE

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more	2 lanes with ADT > 2000	2 Lanes	2 Lanes
Part of a future 4 lanes or more	One way Street with ADT <= 3500	(ADT 750 - 2000)	(ADT < 750)
One-way Streets with ADT > 3500			

Facility Type	Min. Str. Design Traffic (Fig 54-2.C)		
	PV	SU	MU
Interstate or Supplemental Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	No Min	No Min	No Min

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

Class	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

Number of Lanes	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
	Rural			Urban		
	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

MECHANISTIC PAVEMENT DESIGN

Date 21-Mar-12 Route IL 19 @ York Rd
Calcs by: SJP Section 32 WRS-5
Checked by: SJP DuPage County
Class I Roads and Streets Location York Rd
Urban X Rural
Limits of Analysis Station 394+80 to Station 405+58
Length 878 Feet 0.17 Miles

Structural Design Traffic Percent of S.D.T. in Design Lane
PV = 30798 P = 87.00%
SU = 2832 S = 8.00%
MU = 1770 U = 5.00%

MINIMUM SUBGRADE SUPPORT RATING - "POOR"

Flexible Pavement Design Actual TF_F = 11.09 Minimum TF_F = 3.56

Selected Design AC Type
Design AC Mixture Temp 74 °F Design E_{AC} 725 KSI
Design AC Microstrain 60 AC Thickness 12.25 Inch

Rigid Pavement Design Actual TF_F = 14.79 Minimum TF_F = 5.02

Extended Lane 10.25 Inch
15' Panel PCC Thickness for:
Tied Shoulder 0 Inch
Untied Shoulder 0 Inch

Figure 5.05

RIGID PAVEMENT

Date: 21-Mar-12 Route IL 19 @ York Rd
 Quantities by SIP Checked by: [REDACTED] Section 32 WRS-5
 Unit Prices by TM Checked by: [REDACTED] DuPage County
 Net Length 878 Lin. Ft. = 0.17 Miles
 Number Lanes 4 Urban X Rural

ITEMIZED CONSTRUCTION COST

<u>Quantity</u>	<u>Units</u>	<u>Item</u>		<u>Unit</u> <u>Cost</u>	<u>Total</u> <u>Cost</u>
<u>4683</u>	Sq. Yds.	<u>10 Inch</u> Jointed PCC	@	<u>\$39.02</u>	<u>\$182,731</u>
<u>4975</u>	Sq. Yds.	4-Inch (Stabilized/Granular Subbase)	@	<u>\$16.00</u>	<u>\$79,600</u>
<u>0</u>	Sq. Yds.	PCC Shoulder	@	<u>\$0.00</u>	<u>\$0</u>
	Lin. Ft.	Pipe Underdrains	@		
<u>0</u>		Subbase Gran. Mat., Type C	@	<u>\$0.00</u>	<u>\$0</u>
<u>1,756</u>	Lin. Ft.	100% Shoulder Joint Seal	@	<u>\$2.00</u>	<u>\$3,512</u>

Total Cost of Original Pavement Construction \$265,843

ITEMIZED MAINTENANCE AND REHABILITATION ACTIVITY COST**REHABILITATION ACTIVITY 1 - YEAR 10**

<u>5</u> Sq. Yds.	0.1% Full Depth PCC Pavement Patching	@	<u>\$130.00</u>	<u>\$650</u>
Total Cost of Rehabilitation Activity 1				<u>\$650</u>

RIGID PAVEMENT (Cont.)

Route IL 19 @ York Rd

Section 32 WRS-5

DuPage County

REHABILITATION ACTIVITY 2 - YEAR 15

			Unit Cost	Total Cost
<u>9</u> Sq. Yds.	0.2% Full Depth PCC Pavement Patching	@	<u>\$130.00</u>	<u>\$1,170</u>

Total Cost of Rehabilitation Activity 2 \$1,170

REHABILITATION ACTIVITY 3 - YEAR 20

			Unit Cost	Total Cost
<u>94</u> Sq. Yds.	2% Full Depth PCC Pavement Patching	@	<u>\$0.00</u>	<u>\$12,220</u>
<u>0</u> Sq. Yds.	0.5% Full Depth PCC Pavement Patching	@	<u>\$85.00</u>	<u>\$0</u>
<u>1756</u> Lin. Ft.	100% Longitudunal/ Shoulder Joint	@	<u>\$1.00</u>	<u>\$1,756</u>
	Routing & Sealing			
<u>2634</u> Lin. Ft.	100% Centerline Joint	@	<u>\$1.00</u>	<u>\$2,634</u>
	Routing & Sealing			

Total Cost of Rehabilitation Activity 3 \$16,610

REHABILITATION ACTIVITY 4 - YEAR 25

			Unit Cost	Total Cost
<u>140</u> Sq. Yds.	3.0% Full Depth PCC Pavement Patching	@	<u>\$130.00</u>	<u>\$18,200</u>
<u>0</u> Sq. Yds.	1.0% Full Depth PCC Pavement Patching	@	<u>\$85.00</u>	<u>\$0</u>

Total Cost of Rehabilitation Activity 4 \$18,200

REHABILITATION ACTIVITY 5 - YEAR 30

			Unit Cost	Total Cost
<u>187</u> Sq. Yds.	3.0% Full Depth PCC Pavement Patching	@	<u>\$85.00</u>	<u>\$0</u>
<u>0</u> Sq. Yds.	1.0% Full Depth PCC Pavement Patching	@	<u>\$11.85</u>	<u>\$55,494</u>
<u>4,683</u> Sq. Yds.	Policy HMA Overlay - Pavement	@	<u>\$11.85</u>	<u>\$55,494</u>
<u>0</u> Sq. Yds.	Policy HMA Overlay - Shoulder	@	<u>\$11.85</u>	<u>\$0</u>

Total Cost of Rehabilitation Activity 5 \$79,804

REHABILITATION ACTIVITY 6 - YEAR 35

			Unit Cost	Total Cost
<u>1,756</u> Lin. Ft.	100% Longitudinal Shoulder Joint	@	<u>\$1.00</u>	<u>\$1,756</u>
	Routing & Sealing			
<u>2,634</u> Lin. Ft.	100% Centerline Joint	@	<u>\$1.00</u>	<u>\$2,634</u>
	Routing & Sealing			
<u>1,756</u> Lin. Ft.	50% Random Crack	@	<u>\$1.00</u>	<u>\$1,756</u>
	Routing & Sealing - Assume 100ft/station			
<u>1,124</u> Lin. Ft.	40% Reflective Transverse Crack	@	<u>\$1.00</u>	<u>\$1,124</u>
	Routing & Sealing			
<u>5</u> Sq. Yds.	0.1% Partial-Depth Pavement Patching		<u>\$130.00</u>	<u>\$650</u>
	(Mill & Fill Surface-Interstates; Mill & Fill 2.5in. Non-Interstates)			

Total Cost of Rehabilitation Activity 6 \$7,920

Figure 5.05a(3)

Sheet 4 of 5
 RIGID PAVEMENT (Cont.)
 Route IL 19 @ York Rd
 Section 32 WRS-5
DuPage County

REHABILITATION ACTIVITY 7 - YEAR 40

			Unit Cost	Total Cost
<u>23</u> Sq. Yds.	0.5% Full Depth PCC Pavement Patching	@	<u>\$130.00</u>	<u>\$2,990</u>
<u>23</u> Sq. Yds.	0.5% Partial Depth Pavement Patching	@	<u>\$130.00</u>	<u>\$2,990</u>
	(Mill & Fill Surface-Interstates; Mill & Fill 2.5in. Non-Interstates)			
<u>1,686</u> Lin. Ft.	60% Reflective Transverse Crack	@	<u>\$1.00</u>	<u>\$1,686</u>
	Routing & Sealing			
<u>1,756</u> Lin. Ft.	50% Random Crack	@	<u>\$1.00</u>	<u>\$1,756</u>
	Routing & Sealing - Assume 100ft/station			
<u>1,756</u> Lin. Ft.	100% Longitudinal/ Shoulder Joint	@	<u>\$1.00</u>	<u>\$1,756</u>
	Routing & Sealing			
<u>2,634</u> Lin. Ft.	100% Centerline Joint	@	<u>\$1.00</u>	<u>\$2,634</u>
	Routing & Sealing			
Total Cost of Rehabilitation Activity 7				<u>\$13,812</u>

Sheet 5 of 5
 RIGID PAVEMENT (Cont.)
 Route IL 19 @ York Rd
 Section 32 WRS-5
DuPage County

ANNUAL COST DETERMINATION

Present Worth Calculation:

Total Cost of Original Pavement Construction \$265.843



Present Worth of Rehab Activity 1	<u>\$650</u>	x 0.7441 =	<u>\$484</u>
Present Worth of Rehab Activity 2	<u>\$1.170</u>	x 0.6419 =	<u>\$751</u>
Present Worth of Rehab Activity 3	<u>\$16.610</u>	x 0.5537 =	<u>\$9.197</u>
Present Worth of Rehab Activity 4	<u>\$18.200</u>	x 0.4776 =	<u>\$8.692</u>
Present Worth of Rehab Activity 5	<u>\$79.804</u>	x 0.4120 =	<u>\$32.879</u>
Present Worth of Rehab Activity 6	<u>\$7.920</u>	x 0.3554 =	<u>\$2.815</u>
Present Worth of Rehab Activity 7	<u>\$13.812</u>	x 0.3066 =	<u>\$4.235</u>

Total Life Cycle Cost (Present Worth) \$59.053

Annual Cost Per Mile Calculation

Total PW	x CRF _n /	Length		= Annual Cost / Year-Mile
<u>\$59.053</u>	x 0.04079 /	<u>0.17</u>	Mi.	<u>\$77.956</u> per Yr.-Mi.

FLEXIBLE PAVEMENT

Date: 21-Mar-12 Route IL 19 @ York Rd
 Quantities by SIP Checked by:  Section 32 WRS-5
 Unit Prices by TM Checked by:  DuPage County
 Net Length 878 Lin. Ft. = 0.17 Miles
 Number Lanes 4 Urban X Rural
 Single Lane Paving X Dual Lane Paving

ITEMIZED CONSTRUCTION COST

<u>Quantity</u>	<u>Units</u>	<u>Item</u>		<u>Unit Cost</u>	<u>Total Cost</u>
<u>4.683</u>	Sq. Yds.	Class I Surface Course	@	<u>\$11.85</u>	<u>\$55,494</u>
<u>4.683</u>	Sq. Yds.	Class I Binder Course	@	<u>\$29.98</u>	<u>\$140,396</u>
<u>0</u>	Sq. Yds.	Stabilized Shoulders	@	<u>\$0.00</u>	<u>\$0</u>
	Lin. Ft.	Pipe Underdrains	@		
<u>0</u>		Subbase Gran. Matl., Type C	@	<u>\$0.00</u>	<u>\$0</u>
<u>4.683</u>	Sq. Yds.	Poly Binder	@	<u>\$10.97</u>	<u>\$51,373</u>

Total Cost of Original Pavement Construction \$247,263

ITEMIZED MAINTENANCE AND REHABILITATION ACTIVITY COST**REHABILITATION ACTIVITY 1 - YEAR 5**

				<u>Unit Cost</u>	<u>Total Cost</u>
<u>483</u>	Lin. Ft.	50% Random/Thermal Cracking & Sealing (Assume 110ft/station)	@	<u>\$1.00</u>	<u>\$483</u>
<u>1756</u>	Lin. Ft.	100% Longitudinal Shoulder Joint Routing & Sealing	@	<u>\$1.00</u>	<u>\$1,756</u>
<u>2634</u>	Lin. Ft.	100% Centerline Joint Rounting & Sealing	@	<u>\$1.00</u>	<u>\$2,634</u>
<u>5</u>	Sq. Yds.	0.1% Partial-Depth Pavement Patching Mill & Fill Surface	@	<u>\$90.00</u>	<u>\$450</u>

Total Cost of Rehabilitation Activity 1 \$5,323

REHABILITATION ACTIVITY 2 - YEAR 10

				<u>Unit</u> <u>Cost</u>	<u>Total</u> <u>Cost</u>
<u>23</u>	Sq. Yds.	0.5% Partial-depth HMA Pavement Patching - Mill & Fill Surface	@	<u>\$90.00</u>	<u>\$2,070</u>
<u>483</u>	Lin. Ft.	50% Random/ Thermal Crack Routing & Sealing (Assume 110ft/station)	@	<u>\$1.00</u>	<u>\$483</u>
<u>1756</u>	Lin. Ft.	100% Longitudinal Shoulder Joint Routing & Sealing	@	<u>\$1.00</u>	<u>\$1,756</u>
<u>2634</u>	Lin. Ft.	100% Centerline Joint Rounting & Sealing	@	<u>\$1.00</u>	<u>\$2,634</u>

Total Cost of Rehabilitation Activity 2 \$6,943

REHABILITATION ACTIVITY 3 - YEAR 15

				<u>Unit</u> <u>Cost</u>	<u>Total</u> <u>Cost</u>
<u>4,683</u>	Sq. Yds.	2.00in. Milling - Pavement & Shoulder	@	<u>\$1.75</u>	<u>\$8,195</u>
<u>47</u>	Sq. Yds.	1.0% Partial-depth Pavement Patching (Mill & Fill Addition 2.00in.)	@	<u>\$90.00</u>	<u>\$4,230</u>
<u>524</u>	Sq. Yds.	2.00in. HMA Overlay Pavement & Shoulder	@	<u>\$105.80</u>	<u>\$55,441</u>

Total Cost of Rehabilitation Activity 3 \$67,866

FLEXIBLE PAVEMENT (Cont.)

Route IL 19 @ York Rd

Section 32 WRS-5

DuPage County

Unit TotalCost Cost

REHABILITATION ACTIVITY 4 - YEAR 20

<u>1756</u>	Lin. Ft.	100% Longitudinal Shoulder Joint Routing & Sealing	@	<u>\$1.00</u>	<u>\$1,756</u>
<u>2634</u>	Lin. Ft.	100% Centerline Joint Rounting & Sealing	@	<u>\$1.00</u>	<u>\$2,634</u>
<u>483</u>	Lin. Ft.	50% Random/ Thermal Crack Routing & Sealing (Assume 110ft/station)	@	<u>\$1.00</u>	<u>\$483</u>
<u>5</u>	Sq. Yds.	0.1% Partial-Depth HMA Pavement Patching (Mill & Fill Surface)	@	<u>\$90.00</u>	<u>\$450</u>

Total Cost of Rehabilitation Activity 4 \$5,323Unit TotalCost Cost

REHABILITATION ACTIVITY 5 - YEAR 25

<u>1756</u>	Lin. Ft.	100% Longitudinal Shoulder Joint Routing & Sealing	@	<u>\$1.00</u>	<u>\$1,756</u>
<u>2634</u>	Lin. Ft.	100% Centerline Joint Rounting & Sealing	@	<u>\$1.00</u>	<u>\$2,634</u>
<u>483</u>	Lin. Ft.	50% Random/ Thermal Crack Routing & Sealing (Assume 110ft/station)	@	<u>\$1.00</u>	<u>\$483</u>
<u>23</u>	Sq. Yds.	0.5% Partial-Depth Pavement Patching (Mill & Fill Surface)	@	<u>\$90.00</u>	<u>\$2,070</u>

Total Cost of Rehabilitation Activity 5 \$6,943Unit TotalCost Cost

REHABILITATION ACTIVITY 6 - YEAR 30

<u>4,683</u>	Sq. Yds.	2.00in. Milling (Pavement only-Std Design @ Pavement & Shoulder-Limiting Strain Criteria Design)	@	<u>\$1.75</u>	<u>\$8,195</u>
<u>94</u>	Sq. Yds.	2.0% Partial-Depth HMA Pavement Patching (Mill & Fill Additional 2.00in. All Designs)	@	<u>\$90.00</u>	<u>\$8,460</u>
<u>0</u>	Sq. Yds.	1.0% Full-Depth HMA Shoulder Patching (Mill & Fill Surface-Standard Design Mill & Fill Additional 2.00in.-Limiting Strain Criteria Design)	@	<u>\$90.00</u>	<u>\$0</u>
<u>983</u>	Tons	HMA Overlay Pvmt (3.75in. - Std Design 2.00in.-Limiting Strain Criterion Design)	@	<u>\$105.80</u>	<u>\$104,005</u>
<u>0</u>	Tons	HMA Overlay Shoulder (1.75in. - Standard Design; 2.00in.-Limiting Strain Criterion Design)	@	<u>\$105.80</u>	<u>\$0</u>

Total Cost of Rehabilitation Activity 6 \$120,660

FIGURE 5.05b(3)

REHABILITATION ACTIVITY 7 - YEAR 35

				<u>Unit</u> <u>Cost</u>	<u>Total</u> <u>Cost</u>
<u>1756</u>	Lin. Ft.	100% Longitudinal Shoulder Joint Routing & Sealing	@	<u>\$1.00</u>	<u>\$1,756</u>
<u>2634</u>	Lin. Ft.	100% Centerline Joint Rounting & Sealing	@	<u>\$1.00</u>	<u>\$2,634</u>
<u>483</u>	Lin. Ft.	50% Random/ Thermal Crack Routing & Sealing (Assume 110ft/station)	@	<u>\$1.00</u>	<u>\$483</u>
<u>5</u>	Sq. Yds.	0.1% Partial-Depth HMA Pavement Patching (Mill & Fill Surface)	@	<u>\$90.00</u>	<u>\$450</u>
Total Cost of Rehabilitation Activity 7					<u>\$5,323</u>

REHABILITATION ACTIVITY 8 - YEAR 40

				<u>Unit</u> <u>Cost</u>	<u>Total</u> <u>Cost</u>
<u>1756</u>	Lin. Ft.	100% Longitudinal Shoulder Joint Routing & Sealing	@	<u>\$1.00</u>	<u>\$1,756</u>
<u>2634</u>	Lin. Ft.	100% Centerline Joint Rounting & Sealing (Single Lane and Dual Lane Paving)	@	<u>\$1.00</u>	<u>\$2,634</u>
<u>483</u>	Lin. Ft.	50% Random/ Thermal Crack Routing & Sealing (Assume 110ft/station)	@	<u>\$1.00</u>	<u>\$483</u>
<u>23</u>	Sq. Yds.	0.5% Partial-Depth Pavement Patching (Mill & Fill Surface)	@	<u>\$90.00</u>	<u>\$2,070</u>
Total Cost of Rehabilitation Activity 8					<u>\$6,943</u>

Sheet 5 of 5
 FLEXIBLE PAVEMENT (Cont.)
 Route IL 19 @ York Rd
 Section 32 WRS-5
DuPage County

ANNUAL COST DETERMINATION

Present Worth Calculation:

Total Cost of Original Pavement Construction \$247,263

Present Worth of Rehab Activity 1	<u>\$5,323</u>	x 0.7441 =	<u>\$4,592</u>
Present Worth of Rehab Activity 2	<u>\$6,943</u>	x 0.6419 =	<u>\$5,166</u>
Present Worth of Rehab Activity 3	<u>\$67,866</u>	x 0.5537 =	<u>\$43,563</u>
Present Worth of Rehab Activity 4	<u>\$5,323</u>	x 0.4776 =	<u>\$2,947</u>
Present Worth of Rehab Activity 5	<u>\$6,943</u>	x 0.4120 =	<u>\$3,316</u>
Present Worth of Rehab Activity 6	<u>\$120,660</u>	x 0.3554 =	<u>\$49,712</u>
Present Worth of Rehab Activity 7	<u>\$5,323</u>	x 0.3066 =	<u>\$1,892</u>
Present Worth of Rehab Activity 8	<u>\$6,943</u>	x 0.3066 =	<u>\$2,129</u>

Total Life Cycle Cost (Present Worth) \$113,317

Annual Cost Per Mile Calculation

Total PW	x CRF _n /	Length			= Annual Cost / Year-Mile
<u>\$113,317</u>	x 0.04079 /	<u>0.17</u>	Mi.		<u>\$86,518</u> per Yr.-Mi.

MATERIAL TYPE/PERCENTAGE	PCC	10.98%
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PLAIN JOINTED PCC PAVEMENT

FILENAME- JL19 @ York.Rd
 ROUTE- 32 WR6-S
 COUNTY- DuPage
 LOCATION- York Rd
 DATE- 21-Mar-12

21-Mar-12
11:04 AM

0.17 MILES

PROJECT LENGTH (FT) 875
 AVERAGE LANE WIDTH (FT) 12
 NUMBER OF LANES 4
 # OF EDGES 2
 INSIDE SHOULDER WIDTH (FT) 0
 OUTSIDE SHOULDER WIDTH (FT) 0
 # OF CENTERLINES 3
 RIGID THICKNESS- 10.25
 TRAFFIC FACTORS

RIGID- 5.02

TRAFFIC
 PV- 30795
 SU- 2892
 MU- 1770

Percentages
 PV- 87.00%
 SU- 8.00%
 MU- 5.00%

MAINTENANCE COSTS:	ITEM	QUANTITY	UNIT PRICE	COST	PW
Activity 1 YEAR 10	PAVEMENT PATCHING 0.1% (SQ YDS)	5	\$130.00	\$650	
Activity 2 YEAR 15	PAVEMENT PATCHING 0.2% (SQ YDS)	9	\$130.00	\$650	\$484
Activity 3 YEAR 20	PAVEMENT PATCHING 2.0% (SQ YDS)	94	\$130.00	\$12,220	\$751
	SHOULDER PATCHING 0.5% (SQ YDS)	0	\$85.00	\$0	
	SHLDR JT ROUT & SEAL 100% (LF)	1,756	\$1.00	\$1,756	
	CENTERLINE JT ROUT & SEAL 100% (LF)	2,634	\$1.00	\$2,634	
Activity 4 YEAR 25	PAVEMENT PATCHING 3.0% (SQ YDS)	140	\$130.00	\$18,200	\$8,187
	SHOULDER PATCHING 1.0% (SQ YDS)	0	\$85.00	\$0	
Activity 5 YEAR 30	PAVEMENT PATCHING 4.0% (SQ YDS)	187	\$130.00	\$24,310	\$8,692
	SHOULDER PATCHING 1.5% (SQ YDS)	0	\$85.00	\$0	
	POLICY HMA OVERLAY OVMT (SQ YDS)	4,883	\$11.85	\$55,494	
	POLICY HMA OVERLAY SHLDR (SQ YDS)	0	\$11.85	\$0	
Activity 6 YEARS 35	SHLDR JT ROUT & SEAL 100% (LF)	1,756	\$1.00	\$1,756	\$32,879
	CENTERLINE JT ROUT & SEAL 100% (LF)	2,634	\$1.00	\$2,634	
	RANDOM CRACK ROUT & SEAL 50% (LF)	1,756	\$1.00	\$1,756	
	REFL TRANS CRACK ROUT & SEAL 40%	1,124	\$1.00	\$1,124	
	PARTIAL PVMT PATCH 0.1% (SQ YDS)	5	\$130.00	\$650	
Activity 7 YEAR 40	PAVEMENT PATCHING 0.5% (SQ YDS)	23	\$130.00	\$2,990	\$2,815
	SHOULDER PATCHING 0.5% (SQ YDS)	0	\$130.00	\$0	
	REFL TRANS CRACK ROUT & SEAL 60%	1,886	\$1.00	\$1,886	
	RANDOM CRACK ROUT & SEAL 80% (LF)	1,756	\$1.00	\$1,756	
	SHLDR JT ROUT & SEAL 100% (LF)	1,756	\$1.00	\$1,756	
	CENTERLINE JT ROUT & SEAL 100% (LF)	2,634	\$1.00	\$2,634	
	PARTIAL PVMT PATCH (SQ YDS)			\$13,812	\$4,235
					\$58,053
					Total Rehabilitation Cost (Present Worth)

INITIAL COSTS	ITEM	QUANTITY	UNIT PRICE	COST
	PAVEMENT (SQ YDS)	4,883	\$182.731	\$892,731
	STAB SUBBASE (SQ YDS)	4,975	\$79.800	\$397,800
	SHOULDERS (SQ YDS)	0	\$0	\$0
	SHOULDER SEAL (LN FT)	1,756	\$3.512	\$6,167
	SUBBASE GRAN MATL TY C (TONS)	0	\$0	\$0
	CONSTRUCTION INITIAL COST (PW)			\$895,843
	TOTAL REHABILITATION COST (PW)			\$59,053
	TOTAL LIFE CYCLE COST (PW)			\$324,866
	ANNUAL COST PER MILE			\$77,956

MAINTENANCE COSTS:	ITEM	UNIT COST
	PAVEMENT PATCHING (SQ YDS)	\$130.00
	SHOULDER PATCHING (SQ YDS)	\$85.00
	SHLDR JT ROUT & SEAL (LF)	\$1.00
	CENTERLINE JT ROUT & SEAL (LF)	\$1.00
	POLICY HMA OVERLAY PVMT (SQ YDS)	\$11.85
	POLICY HMA OVERLAY SHLDR (SQ YDS)	\$11.85
	RANDOM CRACK ROUT & SEAL (LF)	\$1.00
	REFL TRANS CRACK ROUT & SEAL (LF)	\$1.00
	PARTIAL PVMT PATCH (SQ YDS)	\$130.00

FULL-DEPTH FLEXIBLE
TRAFFIC FACTOR LESS THAN 15.0 (RURAL)
TRAFFIC FACTOR LESS THAN 10.0 (URBAN)
ROUTE-
SECTION-
COUNTY-
LOCATION-

21-Mar-12
11:04 AM

FULL DEPTH FLEXIBLE PAVEMENT

MAINTENANCE COSTS

PW

QUANTITY

ITEM

UNIT PRICE

COST

ACTUAL

MINIMUM

TRAFFIC FACTORS

TRAFFIC

ACTIVITY 1

YEAR 5

RANDTHERM CRACK ROUT & SEAL 50% (LF)

483

\$1.00

\$483

\$1,756

\$2,634

ACTIVITY 2

YEAR 10

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 3

YEAR 15

PARTIAL PMVT PATCH 1.0% (SQ YDS)

47

\$1.75

\$82.25

\$82.25

\$82.25

\$82.25

ACTIVITY 4

YEAR 20

SHLDR JT ROUT & SEAL 100% (LF)

1,756

\$1.00

\$1,756

\$2,634

\$483

\$483

ACTIVITY 5

YEAR 25

SHLDR JT ROUT & SEAL 100% (LF)

1,756

\$1.00

\$1,756

\$2,634

\$483

\$483

ACTIVITY 6

YEAR 30

2" MILL PMVT & SHLDR 100% (SQ YDS)

4,883

\$1.75

\$8,545.25

\$8,545.25

\$8,545.25

\$8,545.25

ACTIVITY 7

YEAR 35

SHLDR JT ROUT & SEAL 100% (LF)

1,756

\$1.00

\$1,756

\$2,634

\$483

\$483

ACTIVITY 8

YEAR 40

SHLDR JT ROUT & SEAL 100% (LF)

1,756

\$1.00

\$1,756

\$2,634

\$483

\$483

ACTIVITY 9

YEAR 45

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 10

YEAR 50

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 11

YEAR 55

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 12

YEAR 60

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 13

YEAR 65

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 14

YEAR 70

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 15

YEAR 75

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 16

YEAR 80

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 17

YEAR 85

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 18

YEAR 90

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 19

YEAR 95

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 20

YEAR 100

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 21

YEAR 105

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 22

YEAR 110

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 23

YEAR 115

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 24

YEAR 120

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 25

YEAR 125

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 26

YEAR 130

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 27

YEAR 135

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 28

YEAR 140

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 29

YEAR 145

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 30

YEAR 150

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

\$2,634

ACTIVITY 31

YEAR 155

PARTIAL PMVT PATCH 0.5% (SQ YDS)

23

\$90.00

\$2,070

\$483

\$1,756

IL 19

USE FOR TF ONLY

Spreadsheet by Uehle - Rev. 11/02

MECHANISTIC PAVEMENT DESIGN

Date: 2/10/12

INPUT (Enter Data in Gray Shaded Cells)

Route: I-49 (IL 19)	Comments: Traffic data for IL 19 at York Rd
Section: 02WRS-5	
County: DuPage	
Location: IL 19 at York Rd	Designer: JMC
Facility Type: Urban Marked State Route	
# of Lanes = 4	
Road Class: 1	
Subgrade Support Rating (SSR): Poor	
Construction Year: 2012	
Design Period (DP) = 20 years	

	ADT	Year
Current:	12600	2008
Future:	37000	2030

Structural Design Traffic			
	Minimum ADT	Actual ADT	Actual % of Total ADT
PV =	0	30,798	87.0%
SU =	250	2,832	8.0%
MU =	750	1,770	5.0%
Struct. Design ADT =	35400	(2022)	

% of ADT in Design Lane			
P =	32%	S =	45%
M =	45%		

FLEXIBLE & RIGID PAVEMENT CALCULATIONS AND ADDITIONAL INPUT

Flexible Pavement

Cpv =	0.15
Csu =	133
Cmu =	483
TF flexible (Actual) =	11.09 (Actual ADT)
TF flexible (Min) =	3.56 (Min ADT Fig 54-2C)
Use TF flexible =	11.09
AC Type =	20
AC Mixture Temperature =	80.0 deg. F (Figure 54-5C)
Design AC Mixture Modulus (Eac) =	550 ksi (Figure 54-5D)
Design Asphalt Concrete Microstrain =	48.3 (Figure 54-5E)
Asphalt Concrete Thickness =	16.25 in. (Figure 54-5F)

Rigid Pavement

Cpv =	0.15
Csu =	144
Cmu =	698
TF rigid (Actual) =	14.79 (Actual ADT)
TF rigid (Min) =	5.02 (Min ADT Fig 54-2C)
Use TF rigid =	14.79
Shoulder or C. & G.	
Rigid Pav. Thickness =	10.00 in. (Figure 54-4D)

DESIGN TABLES FROM BD&E PAVEMENT DESIGN CH. 54 AND PAVEMENT DESIGN MANUAL

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more	2 lanes with ADT > 2000	2 Lanes	2 Lanes
Part of a future 4 lanes or more	One way Street with ADT <= 3500	(ADT 750 - 2000)	(ADT < 750)
One-way Streets with ADT < 3500			

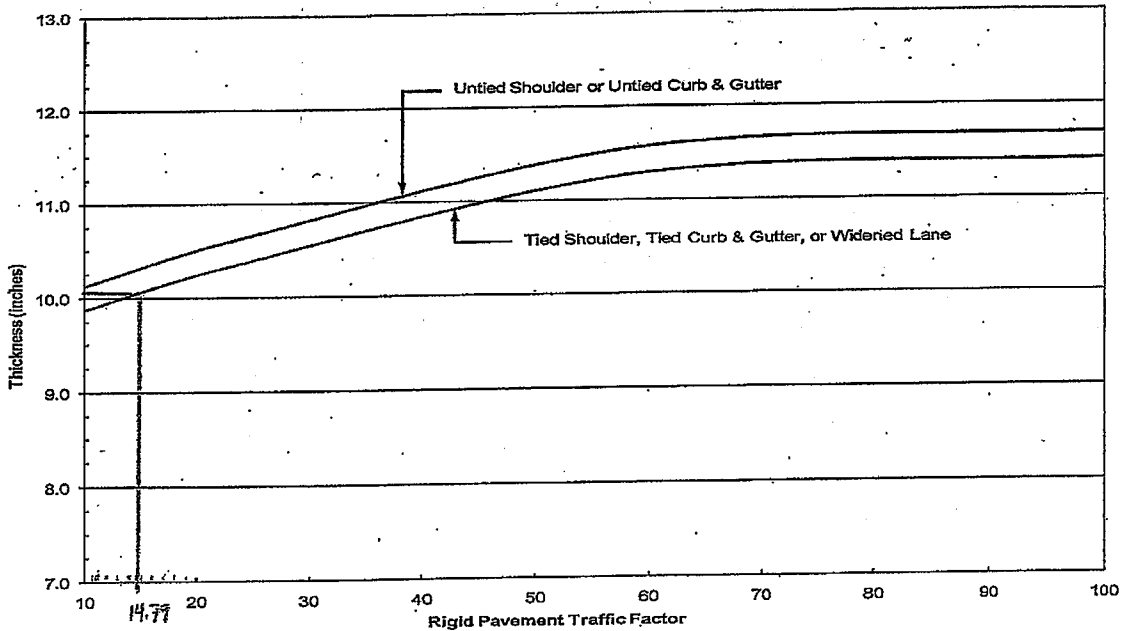
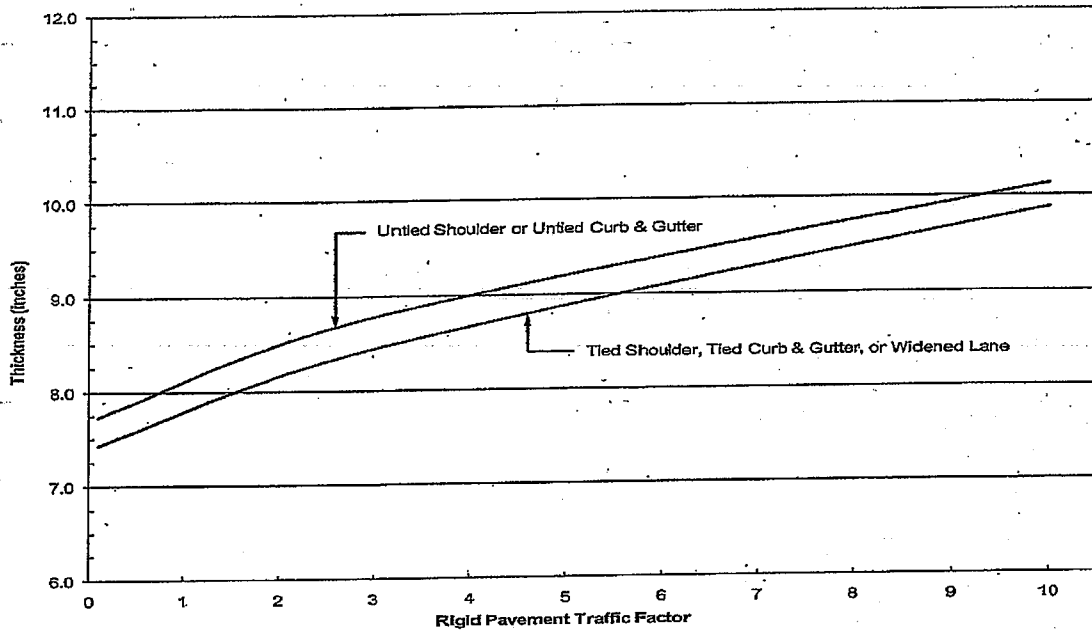
	Min. Str. Design Traffic (Fig 54-2C)		
Facility Type	PV	SU	MU
Interstate or Supplemental Freeway	0	500	1500
Urban Marked State Route			
Unmarked State Route	No Min	No Min	No Min

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4C)		Flexible (Fig. 54-5B)	
Class	Csu	Cmu	Csu	Cmu
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV(ADT>400)	127.75	555.90	109.14	384.35
IV(ADT<=400)	127.75	555.90	9.86	78.84

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

	Figure 54-2B Percentage of ADT in Design Lane					
	Rural			Urban		
Number of Lanes	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4 or 5	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

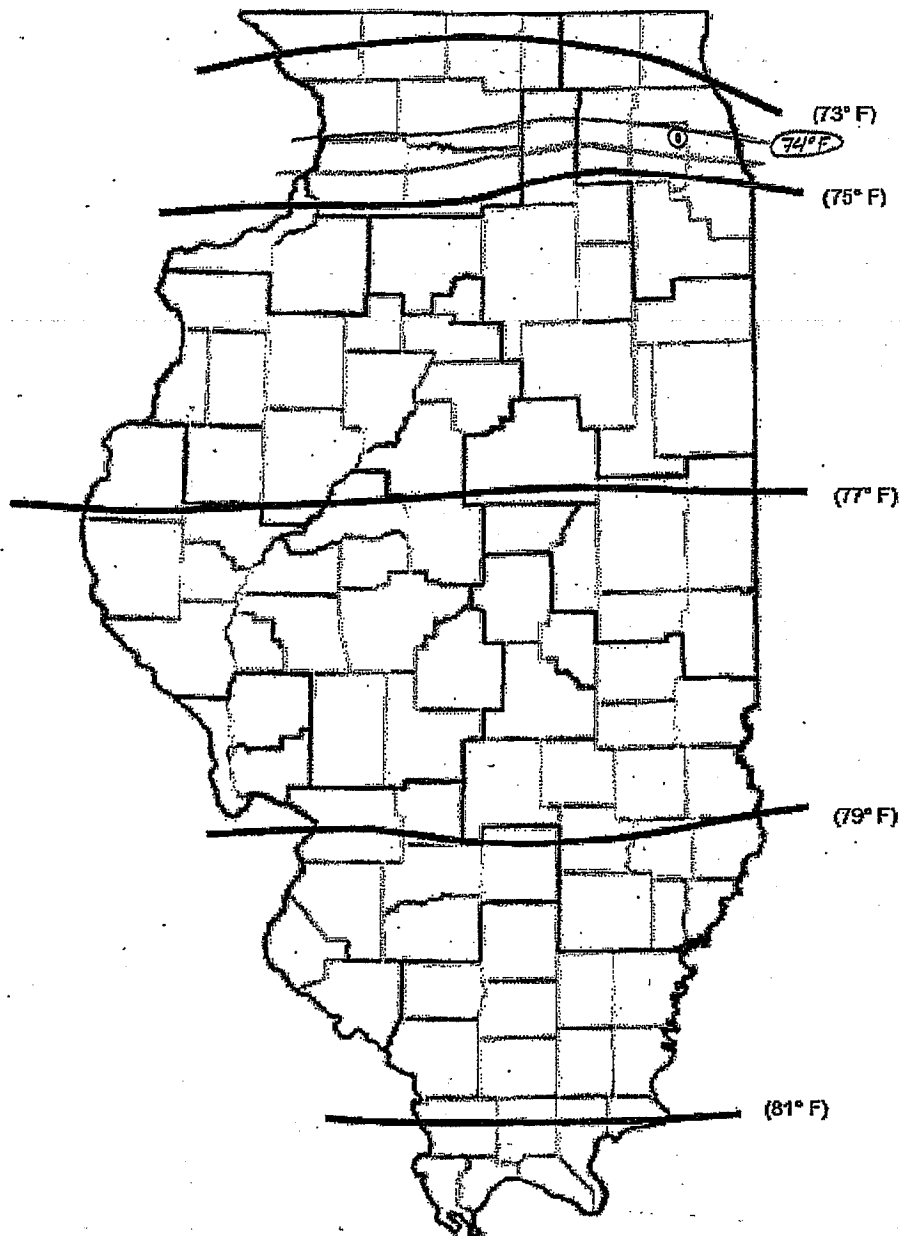


Note: Use of untied shoulder design requires BDE approval.

RIGID PAVEMENT DESIGN CHART
(Mechanistic Design: SSR = Poor)

10 1/4" PCC PAVEMENT (JOINTED)

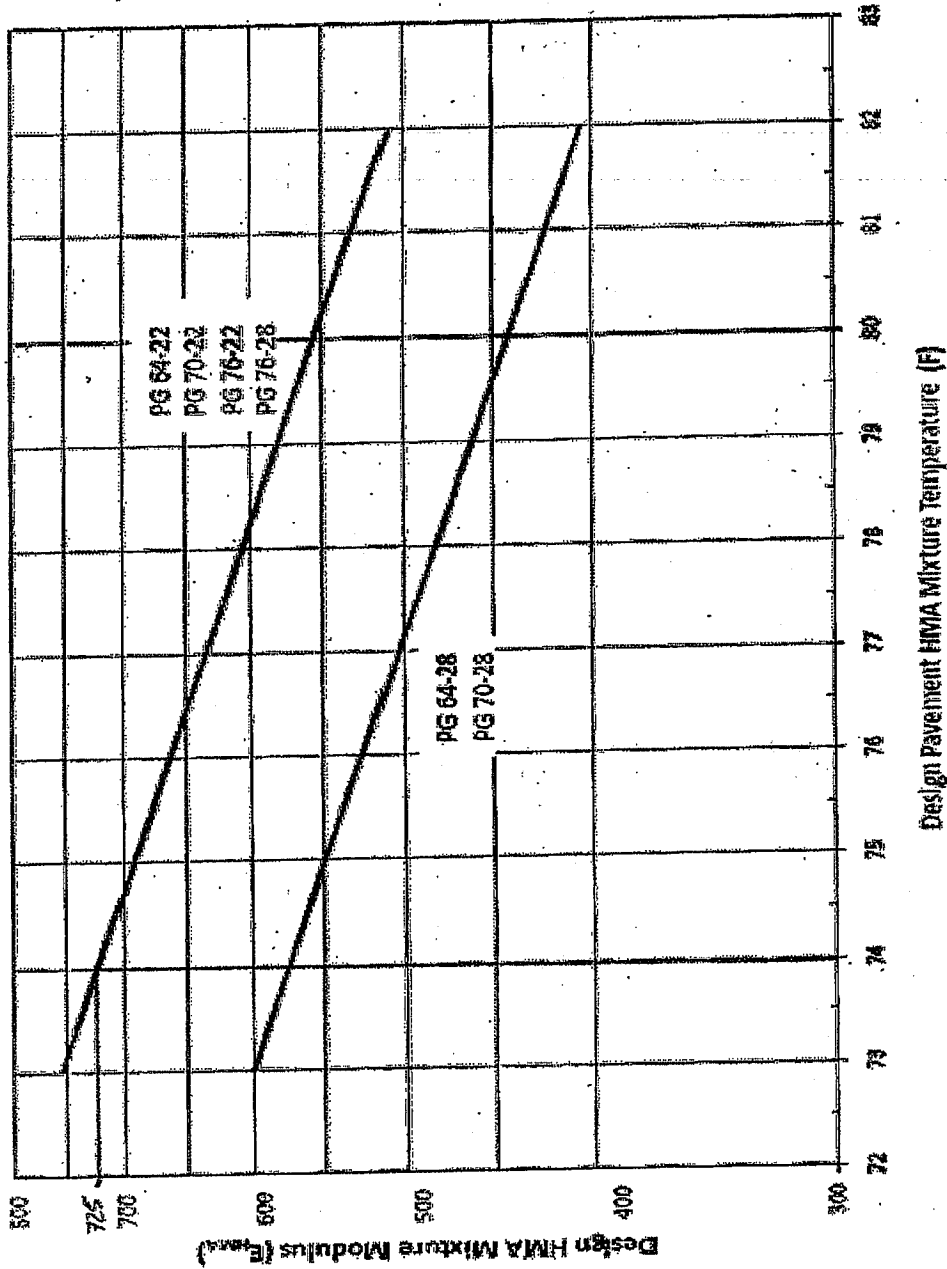
Figure 54-4.E



Note: The minimum design HMA mixture temperature will be 73°F.

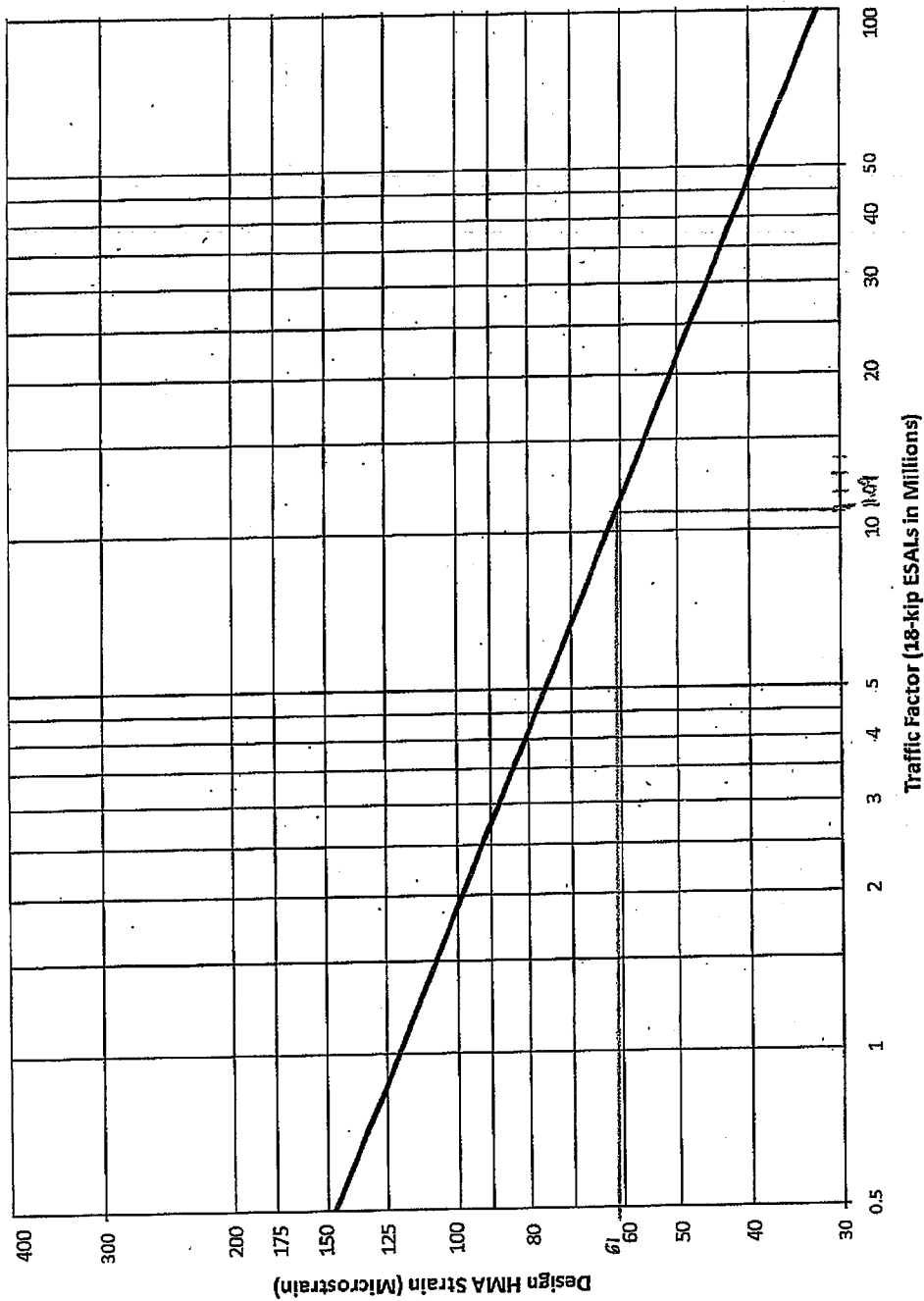
HMA MIXTURE TEMPERATURE
(Mechanistic Design: Flexible Pavement)

Figure 54-5.C



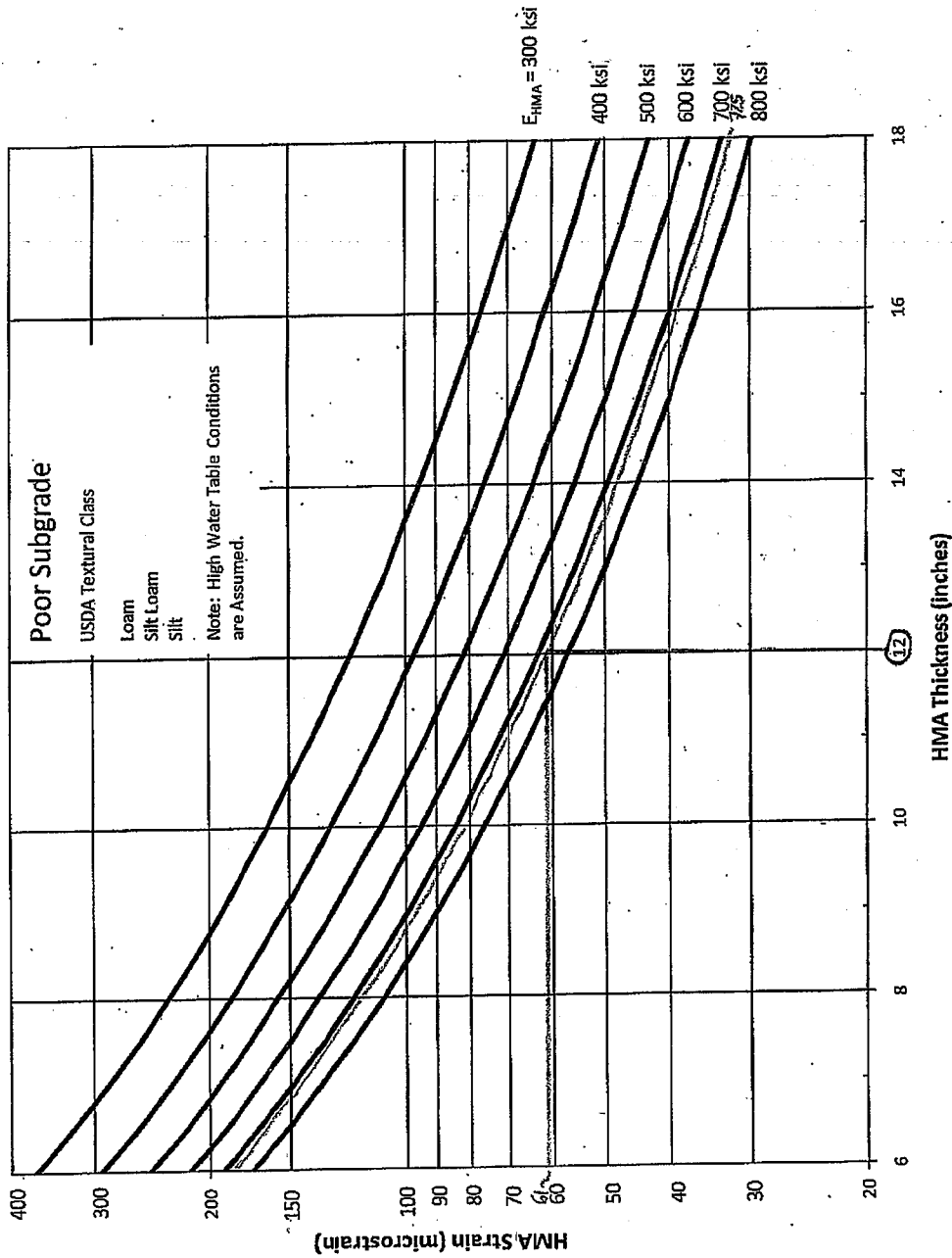
HMA MIXTURE MODULUS (E_{HMA})
(Mechanistic Design: Flexible Pavement)

Figure 54-5.D



DESIGN HMA STRAIN
(Mechanistic Design: Flexible Pavement)

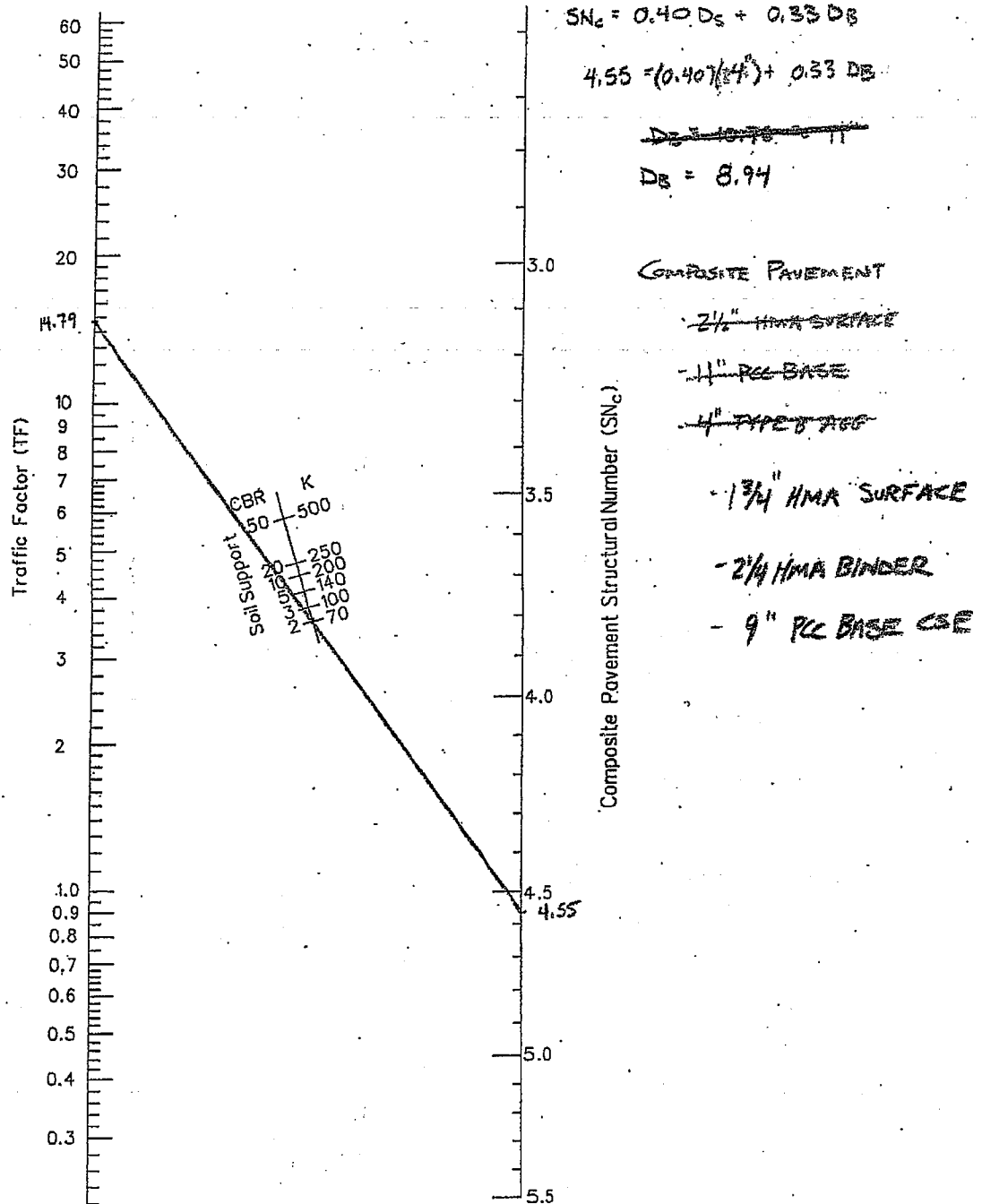
Figure 54-5.E



HMA THICKNESS DESIGN CHART
 (Mechanistic Design: Flexible Pavement: SSR = Poor)

Figure 54-5.F

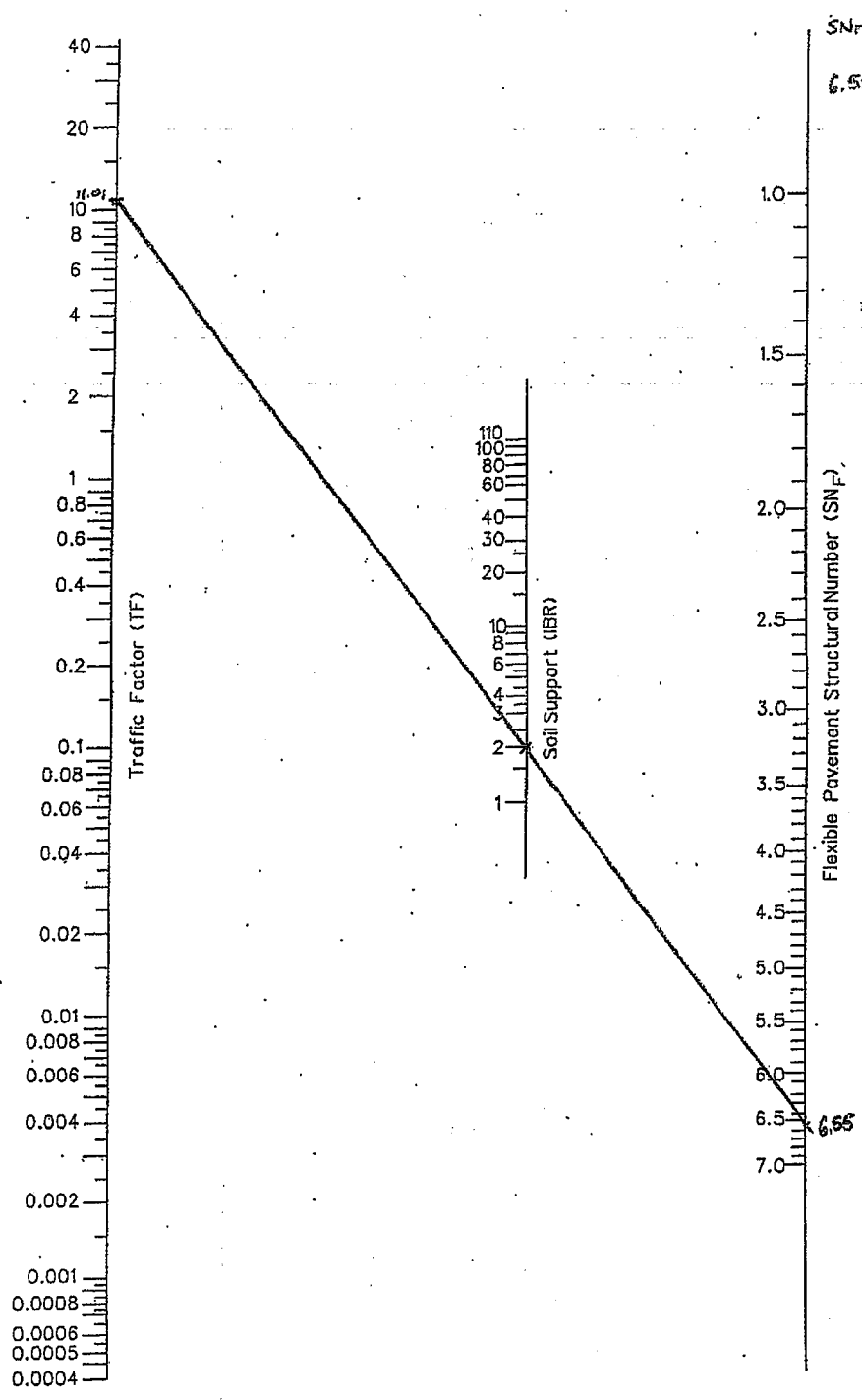
1119



COMPOSITE PAVEMENT DESIGN NOMOGRAPH
(Class I Facilities)

Figure 54-6.A

1219



$$SN_F = a_1 D_1 + a_2 D_2 + a_3 D_3$$

$$6.55 = (0.4)(2.5) + 0.33 D_2 + (0.11)(4)$$

$$D_2 = 15.5''$$

MODIFIED AASHTO PAVEMENT

- 2 1/2" HMA SURFACE
- 15 1/2" HMA BASE
- 4" TYPE B AGG

FLEXIBLE PAVEMENT DESIGN NOMOGRAPH
(Modified AASHTO Design: Class I Facilities)

Figure 54-5.M



Comp. by: _____ Date: _____ Sheet _____ of _____
Chkd. by: _____ Date: _____ Job No. _____
Project: 1L 19 @ YORK
Element: _____

1L 19 WIDENING

FLEXIBLE
MECHANISTIC ~~BUILD~~

- 12" HMA PAVEMENT (FULL DEPTH)
 - 2" POLY HMA SURFACE COURSE, MIX "F", N90
 - 2 1/4" POLY HMA BINDER COURSE, 1L-19.0, N90
 - 7 1/4" HMA BINDER COURSE, 1L-19.0, N90
 - 12" AGG. SUBGRADE IMP.

MODIFIED ASSHTD

- 18" HMA PAVEMENT
- 2 1/8" HMA SURFACE } - TOO LARGE,
- 15 1/8" HMA BASE } DO NOT USE
- 4" AGG. SUBGRADE

COMPOSITE

- 13" PAVEMENT
 - 1 3/4" POLY HMA SURFACE, MIX "F", N90
 - 2 1/4" POLY HMA BINDER, 1L-19.0, N90
 - 9" PCC BASE COURSE

"SEGMENTAL" TOO MATCH
EXISTING?

First Cost Analysis of Widening Project

Date: 4/21/2012
Quantities by: SJP
Unit prices by: SJP

Checked by:
Checked by:
Net Length 969

Route	IL 19
Section	
County	DuPage
Project	IL19 at York
Contract	

Mechanistic Flexible							
Area (Sq. Yd.)	Height (Inches)	Weight (Tons)	Material		Unit Cost	Total	ITEM #
		0	HMA Surface Course, MIX "D" N50	@		\$0.00	40603335
		0	HMA Surface Course, MIX "D" N70	@		\$0.00	40603340
944	2	106	Poly HMA Surface Course, MIX "F" N90	@	\$120	\$12,687.36	40603595
		0	Poly HMA Surface Course, SMA N80	@		\$0.00	40603153
		0	HMA Binder course, IL-19, N50	@		\$0.00	40603080
		0	HMA Binder course, IL-19, N70	@		\$0.00	40603085
944	8	423	HMA Binder course, IL-19, N90	@	\$90	\$38,062.08	40603090
944	2.25	119	Poly HMA Binder course, IL-19, N90	@	\$93	\$11,061.79	40603240
		0	HMA Binder course, SMA, N80	@		\$0.00	40603148
944	NA	NA	12" Aggregate Subgrade		\$16	\$15,104.00	Z6001050
			Total			\$76,915.23	

Composite							
Area (Sq. Yd.)	Height (inches)	Weight (Tons)	Material		Unit Cost	Total	ITEM #
		0	HMA Surface Course, MIX "D" N50	@		\$0.00	40603335
		0	HMA Surface Course, MIX "D" N70	@		\$0.00	40603340
944	2	106	Poly HMA Surface Course, MIX "F" N90	@	\$110	\$11,630.08	40603595
		0	Poly HMA Surface Course, SMA N80	@		\$0.00	40603153
944	2.25	119	Poly HMA Binder course, IL-19, N90	@	\$92	\$10,942.85	
944	9.25	NA	PCC Base Course	@	\$48	\$45,312.00	55900410
944	NA	NA	4" Subgrade Aggregate Material Type B	@	\$10	\$9,440.00	31101200
			Total			\$77,324.93	